Remarks

This Amendment and Response is being submitted in response to the Final Office Action mailed 17 December 2009. Claims 27-40 are pending in the Application. As a preliminary matter, it appears that the instant office action restates the same rejections as the previous office action with the addition of the following statement:

> Regarding the temperature range, US '690 claims 200 C and above. In the case where the claimed ranges overlap or lie inside ranges disclosed by the prior art, a prima facie case of obviousness exists because the prior art discloses the utility of the composition over the entire disclosed range. See MPEP § 2144.05.

In addition, the Examiner has included a section discussing Applicant's prior remarks contained in the response filed 1 December 2009.

Applicant has amended the current application to claim a temperature range of "150°C to less than 200°C." The Examiner has stated in every rejection that the '690 patent discloses a temperature of 200°C and, therefore, Applicant's invention is obvious over the prior art. While disagreeing with this assertion, Applicant has amended the application to claim a temperature of "less than 200 °C" so that there is no question that the '690 patent claims different temperatures than does the instant application. Applicant believes that this amendment places the instant application in proper form for allowance. Out of an abundance of caution, however, Applicant will address additional remarks and rejections propounded by the Examiner.

The Examiner states that the '690 patent does not teach adding the ore to the furnace at a temperature of 400 °C. Applicant respectfully disagrees. The '690 patent teaches that "if a reformer produces waste gas with insufficient heat content to raise the temperature of the charge material to about 400 °C, alternative heating mechanisms are used." Thus, the charge material is heated to about 400 °C prior to being charged into the furnace. The '690 patent makes a specific point of teaching that if the waste gas cannot raise the temperature of the ore to about 400 °C, another source of heat must be used. As such, the ore is about 400 °C when it is charged to the furnace.

In contrast, Applicant's disclosure teaches that the ore is added to the furnace at a temperature of between 150 °C and less than 200 °C. This is significant in that the temperature of the ore must be increased a greater amount once it is charged to the reactor. The '690's disclosure of heating the ore to a temperature of 400 °C does not anticipate or render obvious Applicant's invention. The temperatures are distinctly different and not even close to the same.

The Examiner continues to assert that the process of the '690 patent is similar and that the "process conditions overlap," with the instant invention. If one simply skims the applicable disclosures, it can be argued that the process described in Applicant's invention is similar to the process described by the '690 patent. However, upon a deeper analysis of the actual steps and conditions of the two processes, it becomes clear that they are not the same, and one does not render the other obvious.

The Examiner argues that claims 1-5 of the '690 patent describes a process that is similar to the present invention. However, Applicant's invention is unique in its use of preconditioning iron ore at low temperatures. Applicant's invention calls for the exposure of the iron ore to a temperature of ***150°C to less than 200°C***. This temperature is significantly lower than the temperature disclosed and taught in '690. In contrast to the relatively low temperature of the present invention, the '690 patent teaches the use of a temperature between 200°C and 500°C. There is significant difference in these temperature ranges.

Moreover, Applicant's invention teaches adding the iron ore to the furnace while the ore is at a temperature of 150°C to less than 200°C. In contrast, '690 discloses and teaches that the ore is added to the furnace while at a temperature of 400°C. The significance of this difference is detailed in Applicant's specification on pages 4 – 5. In sum, the addition of lump ore to a direct reduction furnace tends to generate high levels of fines which are detrimental to the process. Lump ore is particularly susceptible to the combined effect of thermal shock and reduction at low temperatures. This tends to increase the amount of fines generated by the lump ore, in turn limiting the amount of lump ore that can be charged to the furnace. The microporous structure of the lump ore is sedimentary in nature. Thus, when the ore is stored in a storage bin for a period of time, it will relieve the internal stresses in the microporous ore. Upon charging the ore into the furnace after the internal stresses are alleviated by the storage, significantly fewer fines are formed. This increases the efficiency of the process and is more economical because

it allows one to use more of the significantly lower priced lump ore as opposed to the higher priced, processed, palletized ore.

The Examiner states that the conditions of the '690 patent and the instant application overlap and, therefore, the '690 patent teaches the water limitation. However, the '690 patent process conditions are not the same as Applicant's. The '690 patent is silent regarding the water content of the iron ore. In contrast, each of Applicant's independent claims (27, 34, 35, and 37) specifically includes a limitation that requires drying the iron ore to a water content of "less than 0.5% by weight." The process of Applicant's pretreatment includes reducing the water content of the ore prior to charging into the furnace. Different temperatures will certainly have different effects on the water content of the iron ore. Because the '690 patent process conditions are not the same as Applicant's invention, and the '690 patent is silent with respect to the water content, it cannot disclose or teach the limitations of Applicant's invention.

The Examiner states that Applicant does not have any "active step relating the storing with the water content or the number of fines." However, the storage step is precisely what is necessary to alleviate the internal stresses present in microporous ore. Applicant's specification details how the production of fines in the direct reduction process is significantly reduced by eliminating, or reducing, the internal stresses through storage over time. The USS reference simply states that it may be necessary to store ore for a period of time because there are months where ore is not mined or shipped. However, USS does not require or teach any advantage of storing the ore; it was

unknown prior to Applicant's discovery that storage of the ore will alleviate internal stresses and reduce the number of fines produced by the direct reduction furnace.

The Examiner also states that Applicant argued the Varajao reference individually without arguing the combination of Varajao with the USS reference. However, it is particularly helpful to analyze what Varajao discloses and teaches prior to analyzing what a combination of Varajao and USS would teach, assuming that Varajao and USS would be combined. The Varajao reference is a study of the microporosity of the iron ore obtained from one specific location in the world, Iron Quadrangle, Brazil. Varajao does not disclose or teach a process for reducing iron ore once it is mined; it is silent with regards to direct reduction furnaces. The only fact disclosed by Varajao that can even relate to Applicant's invention is that the microporous ore described in Varajao could be used in the process disclosed and taught by Applicant. However, Varajao does not teach or disclose the limitations claimed in Applicant's invention. Even when combined with the disclosure of the USS reference, the combination does not disclose or render Applicant's invention obvious. Rather, the combination simply suggests that ore obtained from the Iron Quadrangle in Brazil could be stored for use during the months when it is not mined and shipped.

Noticeably absent from both Varajao and the USS reference is the limitation of reducing the water content to below 0.5%; this limitation is not known nor taught by the prior art. Further, storing the iron ore for a period of one month or more for the purpose of releasing internal stresses and increasing the efficiency of the pre-drying process is

not known in the prior art. It is not disclosed by Varajao, is not disclosed by USS, and is not disclosed by a combination of Varajao with USS. Neither Varajao, nor the USS publication recognizes the problem of excess fines produced in a direct reduction furnace. Further, neither Varajao, the USS publication, or the combination of Varajao and the USS publication disclose any limitation regarding the temperature at which the ore should be pre-heated or charged into the direct reduction furnace. Without teaching or at least suggesting the limitations of pre-treatment storage, reduction of water content, and charging temperature, the combination of Varajao and USS cannot render Applicant's invention obvious.

Conclusion

In light of the amendments to the claims and the above remarks, Applicant believes the claims are in proper form for allowance. Further, Applicant does not believe a terminal disclaimer is necessary in view of the above statements. However, even though applicant believes a terminal disclaimer is not necessary for the reasons mentioned above, upon the indication of allowance of these claims by the Examiner if a terminal disclaimer is filed, Applicant will file a terminal disclaimer.

Respectfully,

/Gregory N. Clements/
Gregory N. Clements
Attorney for Applicants – Reg. No. 30713

CLEMENTS | BERNARD
1901 Roxborough Road, Suite 250
Charlotte, North Carolina 28211 USA
Telephone: 704.790.3600
Facsimile: 704.366.9744
gclements@worldpatents.com

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